IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Kiyoko Ueda et al.

Application No.: 10/575,662 Confirmation No.: 2199

Filed: April 14, 2006 Art Unit: 1795

For: PROCESS FOR PRODUCING RESIN-COATED METAL PARTICLES, RESIN-COATED METAL PARTICLES, AND TONER FOR FORMING CIRCUIT Examiner: R. L. Burney

APPEAL BRIEF

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on March 13, 2009, and is in furtherance of said Notice of Appeal.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

I.	Real Party In Interest
II	Related Appeals and Interferences
III.	Status of Claims
IV.	Status of Amendments
V.	Summary of Claimed Subject Matter

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

MURATA MANUFACTURING CO., LTD.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 19 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 3, 4 and 8
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 1, 2, 5-7, 9-22
4. Claims allowed: none
5. Claims rejected: 1, 2, 5-7, 9-22

C. Claims On Appeal

The claims on appeal are claims 1, 2, 5-7, 9-22

IV. STATUS OF AMENDMENTS

Applicant filed an Amendment After Final Rejection on February 6, 2009. The Examiner responded to the Amendment After Final Rejection in an Advisory Action mailed February 26, 2009. In the Advisory Action, the Examiner indicated that Applicants' proposed amendments had been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Use of a toner containing conductive particles which have been coated with an insulating synthetic resin to form a circuit pattern on a substrate by electrophotography is known. Problems have arisen with the toner since slight changes in production parameters can significantly effect properties of the toner, such as, as non-limiting instances, incomplete coating, insufficient adhesion of the coating to the particles, particle aggregation, and the like.

The present invention is based on, *inter alia,* the discovery of a process for producing resin-coated metal particles in which the resin is strongly adhered to the particles and resists detachment, and in which the need for large-scale production facilities and complicated reactions are not required. Pursuant to the invention, the metal particles surfaces are coated with silica, the silica-coated metal particles are combined with a polymerizable group–containing silane coupling agent so as to absorb the polymerizable group onto the surfaces of the particles, and a polymeric resin coating on the surfaces of

the silica-coated metal particles is formed by polymerizing a composition containing a polymerizable monomer in the presence of the polymerizable group-containing particles.

Independent claim 1 is direct to the process, and can be mapped to the specification, *inter alia*, as follows:

1. A process for producing resin-coated metal particles-comprising (page 5, lines 8-9): providing metal particles with surfaces coated with silica(page 5, lines 10-11); combining the silica-coated metal particles with a polymerizable group–containing silane coupling agent so as to absorb the polymerizable group onto the surfaces of the particles (page 5, lines 12-13; page 8, lines 3-8); and forming a polymeric resin coating on the surfaces of the silica-coated metal particles by polymerizing a composition comprising a polymerizable monomer in the presence of the polymerizable group-containing particles (page 5, lines 13-18).

Independent claim 5 is direct to the product, and can be mapped to the specification, *inter alia*, as follows:

5. A resin-coated metal particle (page 6, lines 9-12) comprising: a metal core having a surface(page 6, lines 9-12); a silica layer covering the surface of the core (page 6, lines 9-12); and a resin layer covering the silica layer (page 6, lines 9-12).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 5-7, 10, 15 and 20-22 were rejected under 35 USC § 102 over Mulvaney (US 6,548,168).

Claim 2 was rejected under 35 USC § 103 over Mulvaney in view of Nakawaza (US 5,853,938).

Claims 9, 11-14 and 16 were rejected under 35 USC § 103 over Mulvaney in view of Nakatsuka (EP 0949027 A1), Hakata (US 2001/0051311) and Mizuno US 2002/0191983).

VII. ARGUMENT

Claims 1, 5-7, 10, 15 And 20-22 Are Not Anticipated By Mulvaney

It is known to form a circuit pattern on a substrate by electrophotography using of a toner containing conductive particles coated with an insulating synthetic resin. Various toner problems have arisen because slight changes in the production parameters can significantly effect properties of the toner. Non-limiting examples include incomplete coating of the particles, insufficient adhesion of the coating to the particles, particle aggregation, and the like.

The inventors discovered a process of producing resin-coated metal particles in which the resin is strongly adhered to the particles and resists detachment, and in which the need for large-scale production facilities and complicated reactions are not required. That process and the resulting product are the subject of this application.

Pursuant to the process invention, the metal particles surfaces are coated with silica, the silica-coated metal particles are combined with a polymerizable group–containing silane coupling agent so as to absorb the polymerizable group onto the surfaces of the particles, and a polymeric resin coating on the surfaces of the silica-coated metal particles is formed by polymerizing a composition containing a polymerizable monomer in the presence of the polymerizable group-containing particles. In examining the etching resistance and printing characteristics of toners produced according to this method, it was noted that the coating was hardly detached from the particle surface, and insulation was maintained even if the coating was incomplete. In contrast, when the polymerizable groups were directly absorbed to the particle surface, the etching resistance and printing characteristics were poor, indicating incomplete coating of the surfaces. This is shown in Examples 1 and 2, and Comparative Example 2.

It has been asserted that certain claims are anticipated by Mulvaney. Those claims are numbers 1 and 20-22 which relate to the claimed process, and claims 5-7, 10, and 15 which relate to the resulting product. In fact, none of these claims are anticipated.

The process, in broad terms, involves coating metal particles with silica, absorbing a silane coupling agent which contains a polymerizable group onto the of silica-coated surface, and then polymerizing a composition containing a polymerizable monomer in the presence of the polymerizable group-containing particles. The resulting product has a core, a silica layer covering the core surface, and a polymeric resin coating on the surface of the silica layer.

Mulvaney teaches a process in which a mixture of nanoparticles, coating composition and ligand is prepared, and the coating composition and ligand are deposited on the particles (column 2, lines 28-49). The particles can be of a metal and the ligand can be a silane coupling agent. The coating can be silica. The novelty rejection is untenable because combining the particles, silica and silane coupling agent in a single step is not the same as combining the particles with silica in a first step, and combining the silane with the product of the first step in a second step, even if the claimed polymerization were ignored (which would be improper). Mulvaney does teach a stepwise procedure in which the particles and source of the coating are first combined and then the silane is added (column 7, lines 26-28), but the novelty rejection is still untenable because no polymerization is thereafter effected.

Mulvaney contains no teaching (or suggestion for that matter) of a process in which a coupling agent is absorbed on the surface of a silica-coated metal and thereafter a resin coating is formed by polymerizing a polymerizable monomer. To the extent that there may be reference to possible multiple coatings in this reference, that refers to the coating entity connected to the particles by the coupling agent (resulting in, for example, a particle-coupling agent-coating-coating structure). There is no teaching (or suggestion) of interposing anything between the particles and the coupling agent.

Mulvaney teaches a particle, which may or may not be a metal, which is coupled by the ligand to a coating layer which layer may be the same material as the core or be an insulating, semiconducting and/or metallic coating. The structure of the Mulvaney product is thus particle - silane coupling agent – silica, even assuming that silica is used as the coating and there are multiple coating layers. There is no silica disposed between the

particle core and the coupling agent. There is no disclosure of a silica coated metallic core where the silica is connected by a coupling agent to a polymerized resin layer, i.e., a structure of particle – silica – silane – polymer, as in the appealed claims.

Mulvaney fails to teach either the process or the product of the appealed claims. The Section 102 rejection is untenable.

Claim 2 Is Not Obvious Over Mulvaney In View Of Nakawaza

Appealed process claim 2 is dependent on process claim 1 and adds the steps of heating the polymeric resin on the particles at a temperature higher than the melting point of that resin and then cooling the resin so as to form a spherical product.

It has been shown in the prior section that Mulvaney does not teach a process in which a silica-coated particle surface has absorbed to it a polymerizable group-containing silane, nor thereafter polymerizing anything in the presence of the silica-coated particle surface with a polymerizable group-containing silane absorbed thereto. Beyond the lack of that teaching, nothing in Mulvaney suggests such a process.

The Nakawaza reference was not cited to overcome any deficiencies in Mulvaney relating to the basic process of claim 1 (on which rejected claim 2 is dependent), and in fact, it does not. Nakawaza was cited only to show rapid cooling. The combination of Mulvaney with Nakawaza therefore can not render claim 2 obvious.

Claims 9, 11-14 And 16 Are Unobvious Over Mulvaney
Combined With Nakatsuka, Hakata And Mizuno

All of claims 9, 11-14 and 16 are directed to the product and are dependent, directly or indirectly, on product claim 5.

Mulvaney does not teach or suggest a silica-coated particle with a polymer layer covering the silica layer, as shown above. None of the additional references, Nakatsuka, Hakata and Mizuno, were cited to overcome the deficiencies in the primary reference with respect to the independent claim, claim 5, and in fact, they do not. Nakatsuka teaches a multilayer-coated powder or polymer in which at least one layer is a metal hydroxide or a metal oxide, and another layer may be silica, as shown in the titania-coated silica-coated iron powder of Example 1, but it does not disclose a polymer-coated silica-coated metal core. Hakata was cited to show developers comprise toner and carriers, and Mizuno to show a particular particle size. None of these additional references teach or suggest connecting a resin (of any type) to a silica-coated metal by means of a coupling agent nor the product which results therefrom. Since these secondary references do not cure the basis deficiencies of Mulvaney, no combination can render the claimed invention obvious.

Conclusion

The rejections should be reversed and all claims allowed.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Applicant on February 6, 2009.

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Respectfully submitted,

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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/575,662

1. A process for producing resin-coated metal particles-comprising: providing metal particles with surfaces coated with silica; combining the silica-coated metal particles with a polymerizable group–containing silane coupling agent so as to absorb the polymerizable group onto the surfaces of the particles; and forming a polymeric resin coating on the surfaces of the silica-coated metal particles by polymerizing a composition comprising a polymerizable monomer in the presence of the polymerizable group-containing particles.

2. The process for producing the resin-coated metal particles according to claim 1, the process further comprising heating the polymeric resin on the particles at a temperature higher than the melting point of the polymeric resin and then cooling the polymeric resin so as to form a spherical product.

5. A resin-coated metal particle comprising: a metal core having a surface; a silica layer covering the surface of the core; and a resin layer covering the silica layer.

6. The resin-coated metal particle according to claim 5, wherein the particle metal is selected from the group consisting of copper, silver, nickel, and silver-palladium.

7. The resin-coated metal particle according to claim 6, wherein the surface of the metal core is an oxidized surface.

9. The resin-coated metal particle according to claim 7 in combination with an electrophotographic carrier.

10. The resin-coated metal particle according to claim 5, wherein the surface of the metal core is an oxidized surface.

11. The resin-coated metal particle according to claim 6 in combination with an electrophotographic carrier.

12. The resin-coated metal particle according to claim 5 in combination with an electrophotographic carrier.

13. The resin-coated metal particles according to claim 5, wherein the particles have a particle size of 0.5 to 20 μm.

14. The resin-coated metal particle according to claim 13 in combination with an electrophotographic carrier.

15. The resin-coated metal particles according to claim 5, wherein the surface of the resin is spherical.

16. The resin-coated metal particle according to claim 15 in combination with an electrophotographic carrier.

17. A process for producing a toner for forming a circuit which comprises combining the resin-coated metal particles according to claim 5 with an electrophotographic carrier.

18. The process for producing a toner according to claim 17, wherein the metal of the particles are copper.

19. The process for producing a toner according to claim 17, wherein the particles are spherical.

20. The process for producing the resin-coated metal particles according to claim 1, wherein the particle metal is selected from the group consisting of copper, silver, nickel, and silver-palladium.

21. The process for producing the resin-coated metal particles according to claim 1, wherein the composition comprising a polymerizable monomer, a polymerization initiator, and a dispersant, and wherein the process further comprises coating the surface of the metal particles with silica.

22. The process for producing the resin-coated metal particles according to claim 1, further comprising oxidizing the surface of the metal particles before coating them with silica.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.